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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,346	09/23/2005	Kong Lim Toh	DE 030087	1325
65913	7550	07/15/2009		
NXP, B.V. NXP INTELLECTUAL PROPERTY & LICENSING M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			EXAMINER LEE, BENNY T	
			ART UNIT 2817	PAPER NUMBER
			NOTIFICATION DATE 07/15/2009	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

### Office Action Summary

**Application No.**

10/550,346

**Applicant(s)**

TOH, KONG LIM

**Examiner**

Benny Lee

**Art Unit**

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 4-6, 8, 10-12, 15 and 24-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4-6, 8, 24, 25, 27, 10-12, 15, 29, 31 is/are rejected.
- 7) ☒ Claim(s) 26, 28, 30 and 32-34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

The disclosure is objected to because of the following informalities: In the replacement paragraph to page 7, line 3, 5<sup>th</sup> & 6<sup>th</sup> lines therein, note that “1,0” should properly be --1,0-- & “0,44” (i.e. 6<sup>th</sup> line) should properly be --0,44--, respectively for an appropriate characterization. Appropriate correction is required.

The following claims have been found objectionable for reasons set forth below:

In claim 1, 4<sup>th</sup> paragraph, 3<sup>rd</sup> line therein, note that “one” should be rephrased as --a respective-- for an appropriate characterization; 4<sup>th</sup> line therein, note that “rest” should be rewritten as --remainder-- for an appropriate characterization; 7<sup>th</sup> line therein, note that --a corresponding-- should be inserted prior to “one” for an appropriate characterization.

In claim 10, 7<sup>th</sup> paragraph, 3<sup>rd</sup> line therein, note that “one” should be rephrased as --a respective-- for an appropriate characterization; 4<sup>th</sup> line therein, note that “rest” should be rewritten as --remainder-- for an appropriate characterization; 8<sup>th</sup> line therein, note that --a corresponding-- should be inserted prior to “one” for an appropriate characterization..

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 5, 6 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Heckaman et al (of record).

Heckaman et al (Fig. 6) discloses a switch circuit device comprising: two input terminals (i.e. RF IN 28, RF IN 30) and an output terminal (i.e. RF OUT 35); first switches (i.e. SPST switch modules 20, 22) having first and second ports (i.e. one port is connected to the corresponding RF IN terminal; another port is connected to corresponding transmission lines 36,

38); and a second switch (i.e. SPDT module 24) having branch ports series connected to corresponding SPST modules (20, 22) via corresponding transmission lines (36, 38). As known to those of ordinary skill in the art, an SPST (i.e. single pole-single throw) switch functions to provide either a high insertion loss (i.e. open) state or a low insertion loss (i.e. closed) state depending on the bias voltage (i.e. 5V/0V) applied to the transistors of the corresponding SPST switch (i.e. via corresponding bias voltage inputs 32, 34). In a similar manner, an SPDT (i.e. single pole-double throw) switch functions to provide either a low insertion loss (i.e. closed) state to one of the branches while providing a high insertion loss (i.e. open) state to the other one of the two branches or vice versa depending on the complementary bias voltage (i.e. 5V/0V or 0V/5V) applied to the corresponding branch (i.e. by the corresponding bias voltage applied to bias voltage inputs 32, 34). Thus the corresponding SPST switch module is electrically series connected to a corresponding branch of the SPDT module and is therefore both the SPST module and the series connected SPDT branch are biased on or off depending of the voltage applied to the corresponding bias voltage input. Therefore, the SPST witches in both switch branches cannot be turned-on or turned-off at the same time, thereby resulting in the described complementary switch operation for switches in the branches. Regarding claim 4, it should be noted that each one of SPST switch module comprises of a plurality of “discrete electronic parts” (i.e. a plurality of transistors”. Regarding claim 5, note that Fig. 13, which is a physical realization of the switch in the fig. 6 embodiment, discloses that the switches are disposed in an “integrated circuit” configuration upon a substrate. With regard to the operation of the bias voltage being applied to the corresponding switches, note that the description at column 5, line 64 to column 6, line 2 and column 6, lines 11-21 describe how only two bias voltages or

“drivers” are needed to provided the complementary (i.e. in-phase voltage signal, inverted voltage signal) bias control voltages (e.g. 5V/0V) to selectively switch the corresponding SPST & SPDT switch modules.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 24, 25, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heckaman et al in view of Even-or (both of record).

Note that Heckaman et al (Fig. 6) discloses the claimed invention except that the “first switches” are implemented by transistors and not by series connected PIN (i.e. switching) diodes having a driver control connected to the junction between the diodes, as respectively recited in claims 24, 25 & 27.

However, as disclosed in an alternative realization of the switches, Heckaman et al (Fig. 3) suggests that such switches can alternatively be realized by switching PIN diodes.

Moreover, Even-or (e.g. Fig. 1A) discloses a diode switch configuration having two series connected diodes (i.e. D1, D2) connected between an input (i.e. RF<sub>IN</sub>) and an output (i.e. RF<sub>OUT</sub>) to thereby function in an SPST mode in response to a control signal (i.e. ON/OFF) applied to the junction (i.e. the anodes) between the diodes (D1, D2) as provided by a control driver circuit (e.g. 12, 14, 18, 20, 22), as described at column 3, lines 43-46.

Accordingly, it would have been obvious in view of the references, taken as a whole, to have modified the SPST switches in Fig. 6 in Heckaman et al with the series connected PIN

diodes as taught by Even-or. Such a modification would have been considered an obvious substitution of art recognized components usable in an SPST switch, especially since Heckaman et al recognizes that PIN diodes are an equivalent type of switching element to transistors and as such would have performed the equivalent function as the transistors within the context of the disclosed SPST switch, thereby suggesting the obviousness of alternatively using series connected diode switches in place of transistor switches.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heckaman et al in view of Atokawa et al (both of record).

As previously described, Heckaman et al discloses the claimed SPST/SPDT switch combination, but does not disclose the use of such a switch combination in conjunction with a transceiver circuit.

Atokawa (fig. 1) discloses a transceiver circuit (i.e. transmit/receive filter 1) having two input terminals (i.e. antennas 8, 9), a tuner circuit (i.e. receive filter 3); and a switch circuit (i.e. SPDT switch (4) operatively connected to switches (6, 7) which equivalently function as SPST switches) selectively connecting the antennas (8, 9) to the tuner input (i.e. ant2).

Accordingly, it would have been obvious in view of the references, taken as a whole, to have realized the switch circuit (i.e. SPDT switch (4) in conjunction with SPST switches 6, 7) in Atokawa et al by the electrically equivalent switch in the Heckaman et al reference. Such a modification would have been considered an obvious substitution of art recognized equivalent switches, especially since the switch in Atokawa et al has the same electrical configuration as the switch in Heckaman et al set forth above, thereby suggesting the compatibility and thus the obviousness of such a modification. Moreover, as disclosed in Atokawa et al, each switch is

electrically connected to a control circuit for controlling the switching state of the transceiver, and thus must necessarily receive control signal there from.

Claims 10, 15, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Atokawa et al in view of Heckaman et al (both of record).

As described with respect to appropriate preceding rejection(s), Atokawa et al discloses the claimed transceiver circuit. However, Atokawa et al differs from the claimed invention in that it does not disclose the specific switch configuration as recited in claims 10 & 15.

Likewise, as described with respect to preceding rejections, Heckaman et al discloses the switches of the type recited in claims 10 & 15.

Accordingly, it would have been obvious in view of the references, taken as a whole, to have modified the switches in the Atokawa et al reference to have been the type such as disclosed by Heckaman et al. Such a modification would have been considered an obvious substitution of art recognized equivalent switches, especially since the switch in Atokawa et al has the same electrical configuration as the switch set forth above in Heckaman et al, thereby suggesting the compatibility and thus the obviousness of such a modification. Moreover, as disclosed in Atokawa et al, each switch is electrically connected to a control circuit for controlling the switching state of the transceiver and thus must necessarily receive control signal there from.

Claims 11, 12; 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the preceding rejection as applied to claims 10, 15, respectively above, and further in view of Even-or (of record).

Note that the above combination discloses the claimed invention except the switches are implemented by transistors and not by series connected PIN (i.e. switching) diodes having a driver control connected to the junction between the diodes, as respectively recited in claims 11, 12 & 29.

Even-or (e.g. Fig. 1A) discloses a diode switch configuration having two series connected diodes (i.e. D1, D2) connected between an input (i.e.  $RF_{IN}$ ) and an output (i.e.  $RF_{OUT}$ ) to thereby function in an SPST mode in response to a control signal (i.e. ON/OFF) applied to the junction (i.e. the anodes) between the diodes (D1, D2) as provided by a control driver circuit (e.g. 12, 14, 18, 20, 22), as described at column 3, lines 43-46.

Accordingly, it would have been obvious in view of the references, taken as a whole, to have modified the SPST switches in Fig. 6 in the above combination with the series connected PIN diodes as taught by Even-or. Such a modification would have been considered an obvious substitution of art recognized components usable in an SPST switch, especially since Heckaman et al recognizes that PIN diodes are an equivalent type of switching element to transistors and as such would have performed the equivalent function as the transistors within the context of the disclosed SPST switch, thereby suggesting the obviousness of alternatively using series connected diode switches in place of transistor switches.

Applicant's arguments filed 12 May 2009 have been fully considered but they are not persuasive.

Regarding the prior art rejection of claims 1, 10, applicant has asserted that the Heckaman et al reference does not recite "the first switches are configured so that all of the first switches are not in the first state simultaneously" as recited in amended claim 1. In particular,



applicant points to column 6, line 2, of Heckaman et al, which states that “both SPST module (20) and SPST module can be turned off”. Contrary to applicant’s assertion, it should be noted that the particular description in Heckaman et al pointed out by applicant, merely alludes to an operating condition in which the switch is not operating or is turned off (i.e. if both SPST modules are turned off, then the corresponding SPDT branch is likewise turned off and thus the switch module, as a whole, is in a non-operating state). However, in nominal operation, the SPST switch module and the SPDT switch module series connected thereto must necessarily operate in a complementary manner. That is to say, complementary operation necessarily requires an in-phase voltage (i.e. such as 0V) and an inverted voltage (i.e. such as 5V) to selectively provide for turning on a selected one (and not all) of the SPST/SPDT module, while, at the same time, selectively turning off the other one (and not all) of the SPST/SPDT. Such a contention is further supported by the disclosure in Heckaman et al, at column 6, line 1, which recites that “... one of the modules 20 and 22 is turned ON at a time” (i.e. in nominal operation, not all of the switch modules can be at the same state, resulting in “complementary” operation).

Claims 26, 28; 30, 32-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to Benny Lee at telephone number 571 272 1764.

**/BENNY LEE/  
PRIMARY EXAMINER  
ART UNIT 2817**

B. Lee